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EXAMINER	
HUISMAN, DAVID J	

ART UNIT	PAPER NUMBER
2183	

MAIL DATE	DELIVERY MODE
10/30/2007	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/037,666	VAJAPEYAM ET AL.	
	Examiner	Art Unit	
	David J. Huisman	2183	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *30 August 2007*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-6,8-10,13-15,19-31,34 and 36* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☒ Claim(s) *1-6,8-10,13-15,19,31,34 and 36* is/are allowed.

6)☒ Claim(s) *20-30* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☒ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *28 December 2004 & 03 January 2002* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

1. Claims 1-6, 8-10, 13-15, 19-31, 34, and 36 have been examined.

Papers Submitted

2. It is hereby acknowledged that the following papers have been received and placed of record in the file: Power of Attorney as received on 7/10/2007 and Amendment as received on 8/30/2007.

Specification

3. The amended title of the invention is not descriptive. Applicant has merely changed "Processor" to --Processing--, and this change does not add any additional detail to the title. A new title is required that is clearly indicative of the invention to which the claims are directed.

4. The disclosure is objected to because of the following informalities:

- On page 2 (paragraph [0056]) of applicant's specification amendment filed on August 30, 2007, please insert --and-- before "a hard disk" in the last line.

Appropriate correction is required.

Claim Objections

5. Claim 2 is objected to because of the following informalities: It appears as if claim 2 does not further limit claim 1. That is, after skimming the specification and drawings, it appears that the issue window is the only storage storing dependency descriptors dispatched from the control flow logic (Fig.1). This issue window is now included in claim 1. Claim 2 sets forth a

storage area that appears to store the dependency descriptors just as the issue window does. However, an additional storage area is not shown in the drawings, and has not been found in the specification. Is applicant's storage area of claim 2 the same as the issue window of claim 1? If so, this claim is not further limiting. If not, the drawings do not appear to show a second storage area storing dependency descriptors dispatched from the control flow logic. Therefore, applicant is asked to clarify. Appropriate correction is required.

6. Claim 3 is objected to because of the following informalities: In line 2, please delete "a". Appropriate correction is required.

Withdrawn Rejections

7. Applicant, by way of amendment, has overcome the prior art rejections set forth in the previous Office Action for claims 1-6, 8-11, 13-15, 19, 31, and 34. Consequently, these rejections are hereby withdrawn by the examiner.

Maintained Rejections

8. Applicant has failed to overcome the prior art rejections set forth in the previous Office Action for claims 20-30. Consequently, these rejections are respectfully maintained by the examiner and are copied below for applicant's convenience. Applicant has also failed to overcome the 35 U.S.C. 101 rejection set forth in the previous Office Action for reasons described below. The rejection is also copied for applicant's convenience.

Claim Rejections - 35 USC § 101

9. 35 U.S.C. 101 reads as follows:

> Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

10. Claims 28-30 are rejected under 35 U.S.C. 101 because the claimed invention is directed to non-statutory subject matter. Specifically, claims 28-30 claim a machine-readable medium, and said medium, according to original page 18 of applicant's specification, may include a radio frequency (RF) link. While applicant has deleted the RF link language in the amendment filed on August 30, 2007, the deletion alone does not remove it from the original disclosure. Absent a clear disavowal, this amendment, which was not suggested by the examiner, does not overcome the 101 rejection. That is, absent a clear disavowal, applicant still intends for the medium of claims 28-30 to include transmission (radio) signals. Consequently, the claims are drawn to a form of energy. Energy is not a series of steps of acts and thus is not a process. Energy is not a physical article or object and as such is not a machine or manufacture. And finally, energy is not a combination of substances and therefore not a composition of matter. Since energy is not one of the four categories of invention, claims 28-30 are non-statutory. This rejection will be maintained until applicant provides a clear disavowal of the non-statutory subject matter.

Claim Rejections - 35 USC § 102

11. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for

> patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

12. Claims 20-22 and 27-30 are rejected under 35 U.S.C. 102(e) as being anticipated by Park, U.S. Patent No. 6,988,190 (as applied in the previous Office Action).

13. Referring to claim 20, Park has taught a method of processing instructions comprising:

a) selecting and fetching a trace descriptor from a tract storage area in accordance with program control flow. See Fig.5 and Fig.6.

b) identifying from the fetched trace descriptor a dependency descriptor including dependency information for a set of instructions and an address of the set of instructions. See Fig.5 and Fig.6. Note that a start address (field 502) of a sequence of instructions as well as dependency information (fields 506 and 508) exists.

c) dispatching the dependency descriptor for execution. After fetching the descriptor (Fig.5 and Fig.6) from cache, it must be dispatched somewhere for extraction and analysis. This is done for execution of the associated sequence of instructions.

d) fetching the set of instructions from an instruction storage separate from the trace storage area using the address from the dispatched dependency descriptor. Again, field 502 of the descriptor is used to fetch the sequence. It should be noted that the trace cache holds the entries shown in Fig. 6, whereas the instructions themselves are stored in a separate instruction cache (see Fig.2A and column 2, lines 15-16).

e) executing the set of instructions according to dependency information in the dispatched dependency descriptor. See column 4, lines 35-56.

14. Referring to claim 21, Park has taught a method as described in claim 20. Park has further taught updating live-out data in a storage area. Clearly, instructions (such as those shown in Fig.3) write result data to some form of memory, whether it be to a stack, to main memory, or to a register file (which is the most common). The memory written to would hold live-out data, which is data used by subsequent instructions.

15. Referring to claim 22, Park has taught a method as described in claim 20. Park has further taught:

a) storing the identified dependency descriptor from a control flow logic into a storage area. Since the dependency descriptor is updated by "control flow" logic (column 4, lines 35-56), then the control flow logic will store the updates in the address cache.

b) reading the dependency descriptor out of the storage area into the data flow logic. The entries of Fig.5 and Fig.6 are read and used in the execution process.

16. Referring to claim 27, Park has taught a method as described in claim 20. Park has further taught that the selecting comprises predicting a next trace descriptor to process. See the summary of invention section of Park.

17. Referring to claim 28, Park has taught a method of processing instructions comprising:

a) selecting and fetching a trace descriptor in accordance with program control flow. See Fig.5 and Fig.6.

b) identifying from the fetched trace descriptor a dependency descriptor including dependency information for a set of instructions of a dependency chain and an address of the set of instructions, the dependency information to indicate ay least one data on which the dependency chain depends. See Fig.5 and Fig.6. Note that a start address (field 502) of a sequence of

instructions as well as dependency information (fields 506 and 508) exists. Note that the set of instructions is dependent on the counter values 506 and 508. Therefore, the set of instructions is a dependency chain of instructions. And, the counter fields indicate at least one data (counter values) on which the dependency chain depends (i.e., the instruction routine's execution is dependent on the counter values).

c) dispatching the dependency descriptor for execution. After fetching the descriptor, it must be dispatched somewhere for extraction and analysis. This is done for execution of the associated sequence of instructions.

d) fetching the set of instructions using the address from the dispatched dependency descriptor. Again, field 502 of the descriptor is used to fetch the sequence.

e) executing the set of instructions according to dependency information in the dispatched dependency descriptor. See column 4, lines 35-56.

18. Referring to claim 29, Park has taught a medium as described in claim 28. Park has further taught that the operations further comprise updating live-out data in a storage area. Clearly, instructions (such as those shown in Fig.3) write result data to some form of memory, whether it be to a stack, to main memory, or to a register file (which is the most common). The memory written to would hold live-out data, which is data used by subsequent instructions.

19. Referring to claim 30, Park has taught a medium as described in claim 28. Park has further taught:

a) storing the dependency descriptor in an issue window by control flow logic. The information in the trace descriptor, including the dependency descriptor(s) (Fig.5 and Fig.6) must be sent

somewhere to be analyzed. Since the information causes instructions to be issued, it can be said that an "issue window" holds this information.

b) reading the dependency descriptor out of the issue window into data flow logic. The information must be read in order to be analyzed and in order for the information to control logic within the machine. See column 4, lines 35-56.

Claim Rejections - 35 USC § 103

20. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

21. Claims 23-24 are rejected under 35 U.S.C. 103(a) as being unpatentable over Park in view of Arimilli et al., U.S. Patent No. 6,427,204 (as applied in the previous Office Action and herein referred to as Arimilli).

22. Referring to claim 23, Park has taught a method as described in claim 20. Park has not taught that the fetching of a set of instructions is completed just in time for execution. However, Arimilli has taught such a concept. See column 3, lines 1-17. Note that Arimilli has taught that this is a more efficient way of fetching because instructions are only delivered when they are actually needed and pipeline bubbles are prevented. Consequently, it would have been obvious to one of ordinary skill in the art at the time of the invention to modify Park such that instructions are fetched just-in-time, as taught by Arimilli.

23. Referring to claim 24, Park has taught a method as described in claim 20. Although Park has not taught that the instructions are out of order, Arimilli has taught such a concept. See column 1, line 61, to column 2, line 6. Note that the use of resources and efficiency are maximized with out-of-order execution. In addition, out-of-order execution allows for a reduction in stalling. Consequently, it would have been obvious to one of ordinary skill in the art at the time of the invention to modify Park to include instructions that are out-of-order, as taught by Arimilli.

24. Claims 25-26 are rejected under 35 U.S.C. 103(a) as being unpatentable over Park in view of Witt et al., U.S. Patent No. 6,018,798 (as applied in the previous Office Action and herein referred to as Witt).

25. Referring to claim 25, Park has taught a method as described in claim 21. Park has not explicitly taught updating the architectural state using the data in the storage area. However, Witt has taught the concept of having a speculative register file (future file 88, Fig.3) and an actual register file (Fig.3, component 102). The speculative register file holds the most current state of the machine (values determined via speculative execution) and by doing this, instructions may be executed speculatively. Once it is determined that instructions are no longer speculative, the speculative results are made architectural results by writing them to the actual register file. See column 12, line 66, to column 13, line 45. This is a known concept in the art. In essence, this scheme allows for speculative execution which is a method of executing instructions before it is known that they should execute (they are predicted to execute). This maximizes efficiency if they indeed were to execute (predicted correctly). As a result, it would have been obvious to

one of ordinary skill in the art at the time of the invention to modify Park such that the architectural state is updated using the data in the speculative storage.

26. Referring to claim 26, Park in view of Witt has taught a method as described in claim 25. Witt has further taught recovering an earlier architectural state after a misprediction using data in the storage area. See column 18, lines 54-67, and note that after a misprediction, a previous state is achieved by copying actual values into the future file (so that the speculative values are correct). Consequently, by using this newly written data, the system recovers an earlier architectural state.

Allowable Subject Matter

27. Claims 1-6, 8-10, 13-15, 19, 31, 34, and 36 are allowed.

Response to Arguments

28. Applicant's arguments filed on August 30, 2007, have been fully considered but they are not persuasive.

29. Applicant argues the novelty/rejection of claims 20 and 28 on page 9 of the remarks, in substance that:

> "Nothing in the trace cache of Park suggests any use of any dependency descriptor. Nothing in the field 506 or 508 suggests any dependency information. The fields 506 and 508 are current loop iteration count and total loop iteration count. It is not seen how any possible analysis of this information could qualify for the dependency descriptor, especially since dependency descriptor is defined in the present application in paragraph 23."

30. These arguments are not found persuasive for the following reasons:

a) As stated in the rejections, dependency information exists in counter fields 506 and 508 of Fig.5. The counter fields indicate at least one data (counter value) on which the dependency

chain depends (i.e., the instruction routine's execution is dependent on the counter values). Specifically, each time the instruction routine is executed, field 506 is updated, and when the count has reached the value in 508, the routine will no longer execute. Until that point, however, the routine will execute. Therefore, there is a clear dependency on these fields. While applicant argues that dependency descriptor is defined in paragraph [0029] of the specification, applicant should recall that:

1) Although a claim should be interpreted in light of the specification disclosure, it is generally considered improper to read limitations contained in the specification into the claims. See In re Prater, 415 F.2d 1393, 162 USPQ 541 (CCPA 1969) and In re Winkhaus, 527 F.2d 637, 188 USPQ 129 (CCPA 1975), which discuss the premise that one cannot rely on the specification to impart limitations to the claim that are not recited in the claim.

2) "The invention disclosed in Hiniker's written description may be outstanding in its field, but the name of the game is the claim." In re Hiniker Co., 47 USPQ2d 1523, 1529 (Fed Cir. 1998), and

3) "An examiner has the duty to police claim language by giving it the broadest reasonable interpretation." Springs Window Fashions LP v. Novo Industries, L.P., 65 USPQ2d 1826, 1830 (Fed. Cir. 2003).

The examiner asserts that there is no explicit definition of dependency descriptor in paragraph [0029] or anywhere else in the specification. Consequently, the examiner is to give the broadest reasonable interpretation of the term. And, for the reasons set forth above, the examiner feels that Park has taught a dependency descriptor.

Conclusion

31. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to David J. Huisman whose telephone number is (571) 272-4168. The examiner can normally be reached on Monday-Friday (8:00-4:30).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Eddie Chan can be reached on (571) 272-4162. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

DJH
David J. Huisman
October 12, 2007